

IN THE CLAIMS

1. (Original) A method for diagnosing faults in a communications channel using a state machine controlled communications transceiver containing adaptive filters operably coupled to the communications channel, comprising:

generating a plurality of expected state machine sequences;

recording a state machine sequence from the state machine during operation of the transceiver;

normalizing the plurality of expected state machine sequences based on a sample frequency of the state machine sequence;

selecting from the plurality of expected state machine sequences a selected expected state machine sequence that best approximates the state machine sequence;

reading a plurality filter coefficients from the transceiver adaptive filters;

calculating the quality of the communications channel using the plurality of filter coefficients; and

diagnosing faults in the communications channel based on the selected expected state machine sequence and the plurality of filter coefficients.

2. (Original) The method of Claim 1, wherein calculating the quality of the communications channel further includes:

calculating a communications channel pulse response using the plurality of filter coefficients;

calculating a communications channel frequency response using the communications channel pulse response and applying an inverse Fourier transform;

calculating a communications channel transfer function by dividing the communications channel frequency response by a Fourier transform of a transmitted pulse; and

comparing the communications channel transfer function to a standard communications channel transfer function.

3. (Original) The method of Claim 2, further including estimating the length of the communications channel by dividing the value of the transfer function at a specified frequency by an expected loss per unit length of the communication channel at the specified frequency.

4. (Original) A method for determining the quality of a communications channel operably coupled to a communications transceiver containing adaptive filters, comprising:

reading a plurality of filter coefficients from the adaptive filters;

calculating a communications channel pulse response using the plurality of filter coefficients;

calculating a communications channel frequency response using the communications channel pulse response and applying an inverse Fourier transform;

calculating a communications channel transfer function by dividing the communications channel frequency response by a Fourier transform of a transmitted pulse; and

comparing the communications channel transfer function to a standard communications channel transfer function.

Claims 5-12 (Cancelled).

13. (Original) A data processing system adapted to diagnose faults in a communications channel using a state machine controlled communications transceiver containing adaptive filters operably coupled to the communications channel, comprising:

a processor; and

a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:

reading a plurality of expected state machine sequences;

recording a state machine sequence from the state machine during operation of the transceiver;

normalizing the plurality of expected state machine sequences based on a sample frequency of the state machine sequence;

selecting from the plurality of expected state machine sequences a selected expected state machine sequence that best approximates the state machine sequence;
reading a plurality of filter coefficients from the transceiver adaptive filters;
calculating the quality of the communications channel using the plurality of filter coefficients; and
diagnosing faults in the communications channel based on the selected expected state machine sequence and the plurality of filter coefficients.

14. (Original) The data processing system of Claim 13, the program instructions further including:

calculating a communications channel pulse response using the plurality of filter coefficients;
calculating a communications channel frequency response using the communications channel pulse response and applying an inverse Fourier transform;
calculating a communications channel transfer function by dividing the communications channel frequency response by a Fourier transform of a transmitted pulse; and
comparing the communications channel transfer function to a standard communications channel transfer function.

15. (Original) The data processing system of Claim 14, the program instructions further including estimating the length of the communications channel by dividing the value of the transfer function at a specified frequency by an expected loss per unit length of the communication channel at the specified frequency.

16. (Original) A data processing system adapted to determine the quality of a communications channel operably coupled to a communications transceiver containing adaptive filters, comprising:

a processor; and
a memory operably coupled to the processor and having program instructions stored therein, the processor being operable to execute the program instructions, the program instructions including:

- reading a plurality of filter coefficients from the adaptive filters;
- calculating a communications channel pulse response using the plurality of filter coefficients;
- calculating a communications channel frequency response using the communications channel pulse response and applying an inverse Fourier transform;
- calculating a communications channel transfer function by dividing the communications channel frequency response by a Fourier transform of a transmitted pulse; and
- comparing the communications channel transfer function to a standard communications channel transfer function.

Claims 17-24 (Cancelled).

25. (Original) A computer-readable storage medium embodying computer program instructions for execution by a computer, the computer program instructions adapting a computer to diagnose faults in a communications channel using a state machine controlled communications transceiver containing adaptive filters operably coupled to the communications channel, the computer program instructions comprising:

- generating a plurality of expected state machine sequences;
- recording a state machine sequence from the state machine during operation of the transceiver;
- normalizing the plurality of expected state machine sequences based on a sample frequency of the state machine sequence;
- selecting from the plurality of expected state machine sequences a selected expected state machine sequence that best approximates the state machine sequence;
- reading a plurality filter coefficients from the transceiver adaptive filters;
- calculating the quality of the communications channel using the plurality of filter coefficients; and
- diagnosing faults in the communications channel based on the selected expected state machine sequence and the plurality of filter coefficients.

26. (Original) The computer-readable storage medium of Claim 25, the computer program instructions further comprising:

calculating a communications channel pulse response using the plurality of filter coefficients;

calculating a communications channel frequency response using the communications channel pulse response and applying an inverse Fourier transform;

calculating a communications channel transfer function by dividing the communications channel frequency response by a Fourier transform of a transmitted pulse; and

comparing the communications channel transfer function to a standard communications channel transfer function,

27. (Original) The computer-readable storage medium of Claim 26, the computer program instructions further comprising estimating the length of the communications channel by dividing the value of the transfer function at a specified frequency by an expected loss per unit length of the communication channel at the specified frequency.

28. (Original) A computer-readable storage medium embodying computer program instructions for execution by a computer, the computer program instructions adapting a computer to determine the quality of a communications channel operably coupled to a communications transceiver containing adaptive filters, the computer program instructions comprising:

reading a plurality of filter coefficients from the adaptive filters;

calculating a communications channel pulse response using the plurality of filter coefficients;

calculating a communications channel frequency response using the communications channel pulse response and applying an inverse Fourier transform;

calculating a communications channel transfer function by dividing the communications channel frequency response by a Fourier transform of a transmitted pulse; and

comparing the communications channel transfer function to a standard communications channel transfer function.

Claims 29-35 (Cancelled).